UNITED STATES PATENT AND TRADEMARK OFFICE

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10/539,081	06/14/2005	Toshiaki Kakutani	<IPFP163	9212

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EXAMINER
LETT, THOMAS J

ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 June 2005*.
2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.
    4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) *1-26* is/are rejected.
7)☒ Claim(s) *11-14, 17, 20, 23 and 26* is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☒ The drawing(s) filed on *14 June 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    a)☒ All b)☐ Some * c)☐ None of:
        1.☒ Certified copies of the priority documents have been received.
        2.☐ Certified copies of the priority documents have been received in Application No. _____.
        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date *1/12/07, 2/16/07*.
4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____ .

DETAILED ACTION

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

1.   Claims 24-26 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claims call for "A program ..." should be changed to "A computer-readable medium encoded with computer-executable instructions causing a computer incorporated in a printing device to ..." (see page 53 of the Interim Guidelines).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2.   Claims 1-10, 15, 16, 18, 19, 21, 22, 24 and 25 are rejected under 35 U.S.C. 102(b) as being anticipated by Horikoshi (USPN 6,315,387 B1) in view of Horikoshi (JP 11-331585).

Regarding claim 1, Horikoshi discloses a printing system that eventually converts original image data to be printed into dot data as data in unit of dots and prints an image in unit of raster lines as arrays of dots created according to the dot data, said printing system comprising:

a print head (printhead 401, col. 6, lines 6-9) that has multiple dot formation elements (multi-printhead, col. 6, lines 6-7) to create dots (print dots, col. 7, line 14) on a printing medium (printing sheet 407, col. 6, line 22);

a print head control module (data generator 103, figure 3) that prints each raster line included in the image by at least two dot formation elements (multi-printhead, col. 6, lines 6-7);

an image data conversion module that converts the original image data into converted data, which is in a form prior to expansion into dot data corresponding to the multiple dot formation elements and is in a more compressed form than the dot data (binarization unit 804 of figure 9);

a converted data storage module that stores the converted data (memory 101 stores converted data, col. 7, lines 44-45); and

an output module (output controller 102) that outputs the expanded dot data to said print head control module.

Horikoshi '387 does not expressly disclose a data expansion module that successively reads out the stored converted data and expands the converted data into dot data for actuating the multiple dot formation elements.

Horikoshi (JP '585) teaches a binarization expansion module 406 for formation of image dots using printhead nozzles.

Horikoshi and Horikoshi (JP '585) are analogous art because they are from the similar problem solving area of dot printing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to add the expansion module 406 feature of Horikoshi (JP '585) to Horikoshi in order to obtain expansion of dot data. The motivation for doing so would be to store dot data for lines to be printed.

Regarding claim 2, Horikoshi discloses a printing system in accordance with claim 1, wherein said image data conversion module converts the original image data into the converted data in a form prior to a halftoning process for conversion into the dot data (binarization unit 804 performs halftoning, col. 13, lines 54-56).

Regarding claim 3, Horikoshi discloses a printing system in accordance with claim 2, wherein said data expansion module comprises:

a target pixel setting module that sets a target pixel as an object for specification of a dot on-off state (on-off states can be seen in figure 4);

a dot on-off state specification module that expands image data including the target pixel from the converted data stored in said converted data storage module and specifies the dot on-off state in the target pixel based on the expanded image data (on-off states can be seen in figure 4); and

a module that repeats the specification of the dot on-off state with a successive shift of the target pixel, thereby generating dot data for actuating the multiple dot formation elements (on-off states can be seen in figure 4).

Regarding claim 4, Horikoshi discloses a printing system in accordance with claim 3, wherein said print head repeats forward and backward passes relatively on the printing medium to create dots and thereby form raster lines as arrays of dots, said data expansion module comprises a specification result accumulation module that temporarily accumulates results of the specification of the dot on-off state in respective target pixels, and said output module collects results of the specification with regard to dots formed by said print head in at least one forward pass or a backward pass, among the accumulated results of the specification, and outputs the collected results of the specification to said print head control module (forward and reverse printing are employed by the apparatus, col. 13, lines 1-4).

Regarding claim 5, Horikoshi discloses a printing system in accordance with claim 3, wherein said dot on-off state specification module expands data corresponding to the target pixel among the stored converted data and thereby specifies the dot on-off state in the target pixel (on-off states specified by the controller can be seen in figure 4).

Regarding claim 6, Horikoshi discloses a printing system in accordance with claim 1, said printing system comprising an image processing device that processes the original image data and a printing device that uses said print head to form an image on the printing medium, where said image processing device and said printing device are separate from each other, said image data conversion module is incorporated in said image processing device, and said converted data storage module, said data expansion module, said output module, and said print head control module, in addition to said print head, are incorporated in said printing device (the apparatus can be constructed in various configurations, col. 20, lines 51-55).

Regarding claim 7, Horikoshi discloses a printing system in accordance with claim 6, wherein said image processing device further comprises a data transfer module that transfer the converted data to said printing device, said printing device further comprises a data reception module (memory 101 stores working data, col. 7, lines 44-45) that receives the transferred converted data and outputs the converted data to said converted data storage module, and said data expansion module comprises:

a target pixel setting module (path data generation processor, col. 8, lines 59-62+) that sets a target pixel as an object for specification of a dot on-off state;

a dot on-off state specification module that expands image data including the target pixel from the converted data stored in said converted data storage module and specifies the dot on-off state in the target pixel based on the expanded image data (path data generation processor, col. 8, lines 59-62+); and

a module that repeats the specification of the dot on-off state with a successive shift of the target pixel, thereby generating dot data for actuating the multiple dot formation elements (path data generation processor, col. 8, lines 59-62+).

Regarding claim 8, Horikoshi discloses a printing system in accordance with claim 1, wherein said image data conversion module compresses dot data obtained by halftoning the original image data as the conversion into the converted data (using a dot data "thinning" method).

Regarding claim 9, Horikoshi discloses a printing system in accordance with claim 8, wherein said print head control module comprises:

a module that repeats forward and backward passes of said print head on the printing medium and actuates plurality of the dot formation elements apart from each other by a predetermined distance in at least every forward or backward pass, so as to form multiple raster lines (forward and reverse printing are employed by the apparatus, col. 13, lines 1-4); and

a raster position shifting module that shifts a relative position of said print head to the printing medium in a direction crossing the raster lines, so as to fill a gap between a set of raster lines formed previously with another set of raster lines formed later (figure 4 shows the multiple paths used to fill the three lines with dot data).

Regarding claim 10, Horikoshi does not expressly disclose that said data expansion module comprises a dot data storage module that expands dot data, which include dot data for forming a set of raster lines corresponding to the multiple dot formation elements, from the converted data stored in said converted data storage module, and when dot data for forming a next set of raster lines subsequent to the set of raster lines are expanded, stores the dot data for formation of the next set of raster lines.

Horikoshi (JP '585) teaches a binarization expansion table 406 for expanding picture elements, see at least para. 0057.

Horikoshi and Horikoshi (JP '585) are analogous art because they are from the similar problem solving area of dot printing. At the time of the invention, it would have been obvious to

a person of ordinary skill in the art to add the dot data storage module feature of Horikoshi (JP

'585) to Horikoshi in order to obtain expansion of dot data. The motivation for doing so would

be to store dot data for lines to be printed.

Claim 15 is rejected for the same reasoning as claim 1.

Claim 16 is rejected for the same reasoning as claim 2.

Regarding claim 18, Horikoshi discloses a printing method that eventually converts

original image data to be printed into dot data as data in unit of dots and actuates multiple dot

formation elements mounted on a print head according to the dot data, so as to create dots on a

printing medium and print an image in unit of raster lines as arrays of dots, said printing method

comprising the steps of:

converting the original image data into converted data (via binarization unit 804 of figure

9), which is in a form prior to expansion into dot data corresponding to the multiple dot formation

elements and is in a more compressed form than the dot data;

storing the converted data into a memory (memory 101 stores converted data, col. 7,

lines 44-45);

arranging the expanded dot data to make each raster line included in the image formed

by at least two dot formation elements (using multi-printhead, col. 6, lines 6-7); and

actuating the dot formation elements on the print head (using output controller 102),

based on the arranged dot data.

Horikoshi '387 does not successively reading out the stored converted data and

expanding the converted data into dot data for actuating the multiple dot formation elements.

Horikoshi (JP '585) teaches a binarization expansion table 406 for expanding picture

elements, see at least para. 0057.

Horikoshi and Horikoshi (JP '585) are analogous art because they are from the similar problem solving area of dot printing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to add the dot data storage module feature of Horikoshi (JP '585) to Horikoshi in order to obtain expansion of dot data. The motivation for doing so would be to store dot data for lines to be printed.

Regarding claim 19, Horikoshi discloses a printing method in accordance with claim 18, wherein said storing step stores dot data, which is obtained by a halftoning process, in the more compressed form in the memory as the converted data (binarization unit 804 performs halftoning, col. 13, lines 54-56).

Claim 21 is rejected for the same reasoning as claim 18.

Claim 22 is rejected for the same reasoning as claim 19.

Claim 24 is rejected for the same reasoning as claim 18.

Claim 25 is rejected for the same reasoning as claim 19.

Allowable Subject Matter

3.   Claims *11-14, 17, 20, 23 and 26* are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The subject matter of these dependent claims is novel because the print conversion module stores and converts a number of the pixel sets less than the total number of pixel sets in the pixel group for less processing/storage.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to THOMAS J. LETT whose telephone number is (571)272-7464. The examiner can normally be reached on 8-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K. Moore can be reached on (571) 272-7437. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Thomas J. Lett/
Examiner, Art Unit 2625